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Estimated Population Near Uranium Tailings

Battelle Pacific Northwest Labs., Richland, WA

Prepared for

Environmental Protection Agency, Washington, DC

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the U.S. Environmental Protection Agency
under Related Services Agreement
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16. ABSTRACT

The U.S. Environmental Protection Agency (EPA) was directed by Congress to promulgate health and environmental standards for uranium mill tailings under the Uranium Mill Tailings Radiation Control Act of 1978. This Act established two programs to protect public health, safety and the environment from uranium mill tailings. One program was aimed at sites designated inactive--sites at which all milling had stopped and which are no longer under license. The second program was directed at active sites--sites that are licensed by the Nuclear Regulatory Commission (NRC) or the state in which the site is located. EPA issued such standards during 1983.

Estimates of the health risks from radon emitted from tailings sites were a most important consideration in developing these standards. Because radon emitted from tailings piles disperses rapidly in the atmosphere, risk estimates are greatly dependent on the total number of people living nearby and on their proximity to the tailings areas. Thus, it is necessary to have accurate population data at tailings sites to make reasonably accurate estimates of the health risk.

Therefore, EPA concluded that population estimates were needed to assure reasonably accurate health risk estimates. This led to the Pacific Northwest Laboratory (PNL) surveys described in this report.

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ERRATA

Estimated Population Near Uranium Tailings,
by C.H. Bloomster et.al.

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For the Gas Hills, Wyoming mill owned by Pathfinder Mines (page A.10) the population in the East (E) direction in the 2.0 to 3.0 annulus should be 58 instead of 0, per telephone call from Bob Poyser, Pathfinder Mines, to C. H. Bloomster, PNL.

This correction also changes the total population value for the Gas Hills, Wyoming (Pathfinder Mines) mill in Table 5, page 14 from 0 to 58.

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ESTIMATED POPULATION NEAR URANIUM TAILINGS

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INTRODUCTION

The U.S. Environmental Protection Agency (EPA) was directed by Congress to promulgate health and environmental standards for uranium mill tailings under the Uranium Mill Tailings Radiation Control Act of 1978. This Act established two programs to protect public health, safety and the environment from uranium mill tailings. One program was aimed at sites designated inactive--sites at which all milling had stopped and which are no longer under license. The second program was directed at active sites--sites that are licensed by the Nuclear Regulatory Commission (NRC) or the state in which the site is located. EPA issued such standards during 1983.

Estimates of the health risks from radon emitted from tailings sites were a most important consideration in developing these standards. Because radon emitted from tailings piles disperses rapidly in the atmosphere, risk estimates are greatly dependent on the total number of people living nearby and on their proximity to the tailings areas. Thus, it is necessary to have accurate population data at tailings sites to make reasonably accurate estimates of the health risk.

The only population data available to EPA were those contained in environmental impact statements for active sites and in technical reports prepared throughout 1981 by Ford, Bacon and Davis Utah, Inc. for inactive sites. However, the information in these reports was sparse, inconsistent, and lacked sufficient detail for use in assessing health risks. Therefore, EPA concluded that better population estimates were needed to assure reasonably accurate health risk estimates. This led to the Pacific Northwest Laboratory (PNL) surveys described in this report.

The 27 active and 25 inactive mill sites that were to be investigated by PNL are shown in Table 1 and Table 2, respectively. As can be seen in Table 1, those sites considered active may be either operating or shut-down. Eight PNL personnel performed the population studies, which took place during the months of April, May, and June in 1983. For each mill site, a table showing population by radius (1/2, 1, 2, 3, 4, and 5 kilometers) in 16 compass directions was generated. These tables appear in Appendix A.

TABLE 1. Active U.S. Uranium Mills

Operating Mills (16)

Uravan, Colorado
Canon City, Colorado
Milan, New Mexico
Ambrosia Lake, New Mexico (Kerr-McGee Nuclear)
Panna Maria, Texas
Blanding, Utah
La Sal, Utah
Moab, Utah
Ford, Washington
Gas Hills, Wyoming (Pathfinder Mines)
Gas Hills, Wyoming (Union Carbide)
Powder River, Wyoming (Rocky Mountain Energy)
Powder River, Wyoming (Exxon Minerals)
Red Desert, Wyoming
Shirley Basin, Wyoming (Pathfinder Mines)
Shirley Basin, Wyoming (Petrotomics)

Shut-Down Mills (11)

Bluewater, New Mexico
Seboyeta, New Mexico
Church Rock, New Mexico
Marquez, New Mexico
Edgemont, South Dakota
Falls City, Texas (Conoco-Pioneer Nuclear)
Ray Point, Texas
Hanksville, Utah
Wellpinit, Washington
Jeffrey City, Wyoming
Gas Hills, Wyoming (Federal-American Partners)

TABLE 2. Inactive U.S. Uranium Mills

Inactive Mills (25)
Monument Valley, Arizona
Tuba City, Arizona
Durango, Colorado
Grand Junction, Colorado
Gunnison, Colorado
Maybell, Colorado
Naturita, Colorado (General Electric)
Naturita, Colorado (Ranchers Exploration)
New Rifle, Colorado
Old Rifle, Colorado
Slick Rock, Colorado (North Continent)
Slick Rock, Colorado (Union Carbide)
Lowman, Idaho
Ambrosia Lake, New Mexico (Phillips Petroleum)
Shiprock, New Mexico
Belfield, North Dakota
Bowman, North Dakota
Lakeview, Oregon
Canonsburg, Pennsylvania
Falls City, Texas (Susquehanna Western)
Green River, Utah
Mexican Hat, Utah
Salt Lake City, Utah
Converse County, Wyoming
Riverton, Wyoming

PRE-TRIP PREPARATION

The first step undertaken was to gather information on the 52 uranium mill sites through available literature sources. The primary objective was to find tailings layout diagrams and coordinates, but data concerning mill operation, any previous population surveys, and other background information were also gathered.

In general, much more information was available for inactive uranium mills than for operating or shut-down mills. Perhaps the most valuable source identified was a series of engineering assessments of tailings piles at inactive mill sites prepared throughout 1981 by Ford, Bacon and Davis Utah, Inc.[1-20] Another useful source was a report having gamma radiation surveys at inactive uranium mill sites that was prepared in August 1975 by EPA.[21]

Information for operating and shut-down sites was found in a report prepared in April 1982 by Pacific Northwest Laboratory for NRC.[22] This report discusses the environmental factors affecting stabilization of radon suppression covers for uranium mill tailings and also provides location maps. Also of use for these types of mill sites were various environmental impact statements filed by the operating companies.

After these literature sources were reviewed, each mill location was plotted on a general U.S. road map. Mill sites were then grouped and assigned to team members as efficiently as possible, making every effort to minimize traveling distances between sites, hence minimizing travel costs. Ten such groups were formed with a range of 3 to 7 mill sites per group. Eight PNL personnel performed the site visits, since 2 people were assigned 2 groups each.

U.S.G.S. topographic quadrangle maps were used as base plotting maps for the population field surveys. Researchers referred to a topographic index for their particular state to identify the 7 1/2 minute topographic quadrangles necessary to cover the area around their assigned mills. However, many of the mills were located in areas where only 15 minute topographic maps were available. Maps were ordered if their receipt could be guaranteed prior to the researcher's departure; otherwise, they were purchased when the researcher arrived at his destination.

Preceding page blank

If maps were received prior to departure, the tailings layout, the tailings centroid, and the corresponding 5 kilometer radius circle around the centroid were penciled in. In many cases, however, no adequate tailings layout diagrams could be found in the literature. This was especially true for the operating mill sites.

Some individuals contacted state, county, and city planning offices before they left to obtain information over the phone or to arrange meetings upon their arrival. Others waited until they arrived before establishing these contacts.

ON-SITE DATA COLLECTION

After the preliminary collection of maps and site information, team members began on-site data collection. Once in the field, appropriate visits were made to the various planning agencies to secure any additional maps, aerial photos, or statistical population data to be used during the site surveys. Topographic maps with plotted mill tailings disposal areas were the basis for beginning the on-site population surveys.

For most mills, enough detailed information was available to accurately locate and plot the tailings disposal areas for the mill site before beginning the field surveys. For some mills, however, site coordinates and detailed mill tailings layouts were unavailable. In these cases, the information was obtained from on-site inspections of the mill facilities. This visual siting technique was difficult in some instances due to the large extent of company-owned area around the mills. In these instances, tailings disposal areas were sighted at a distance and sketched as best as possible on the topographic maps.

Multiple tailings areas existed on many sites. To facilitate a speedy population density count, an approxmiate center of tailings was selected and a 5 kilometer radius circle was penciled on the maps. To insure adequate ground coverage due to the approximated centers, an additional 1/2 to 1 kilometer area peripheral to the 5 kilometer radius was surveyed.

The actual field surveys involved counting occupied dwellings and plotting their locations on the topographic maps described earlier. Dwelling counts were made by visual inspection via automobile. Only public roads were traversed, so as not to trespass on private lands. Some difficulty arose in navigating and plotting when using older topographic maps that did not show new road changes. In some cases, especially in the sparsely populated and isolated areas, occupied dwellings were difficult to sight due to lengthy private access roads marked no trespassing or to inclement weather causing impassable roads. In other areas, it was difficult to determine if dwellings were occupied due to a seasonal-type appearance or if a "for sale" sign appeared. Under these circumstances, possible clues as to habitation that were used included: a car in front of the dwelling, toys or tools in the yard, clothes hanging on an outside

line, a usable looking mailbox, a recently traveled access road, or smoke coming from the dwelling's chimney.

Densely populated areas posed greater difficulties in estimating occupied dwellings. In these areas, such as near Salt Lake City, Utah, Grand Junction, Colorado, and Canonsburg, Pennsylvania, statistical sampling techniques were used. Areas within the 5 km study radius were selected at random for detailed on-site field surveys. These results were later combined with other detailed census tract and block data to derive the estimated population numbers.

ANALYSIS OF FIELD DATA

Each team member analyzed their plotted field maps and their recorded field data to derive a population distribution around each mill site. The same techniques and standards were followed for each site to insure consistency of results.

First, the centroid of the tailings area was accurately determined for each mill site. In the case of multiple tailings areas, each individual area was assigned a centroid. In conjunction with a coordinate system, each individual centroid was weighted according to its area to derive the appropriate "overall" centroid. A transparent template with inscribed radii at 1/2, 1, 2, 3, 4 and 5 kilometers and divisions at 16 compass directions was used to accurately and uniformly divide the site into sectors. Plotted occupied dwellings were summed in each sector and tabulated.

Overlapping sites occurred in some cases. When this happened, area was apportioned to each site to avoid double counting of population. Straight line divisions were drawn through the points of intersection of the radii around each site center. In the final tabulated population results, asterisks were used to indicate when such site areas fell within other site boundaries. No double counting occurs at any adjacent mill sites.

In determining the population figures for each mill site, the number of occupied dwellings in each sector was multiplied by the average number of persons per household for each particular county. These county statistics for 1980 were obtained from the U.S. Bureau of Census and are shown in Table 3. In a few cases, the average number of persons per household for each city was used because it was considered more representative and often more recent than 1980 county averages. City averages that were used are shown in Table 4.

Because it was not feasible to count every occupied dwelling at the Canonsburg, Pennsylvania, Grand Junction, Colorado, and Salt Lake City, Utah mill sites, the above method of population determination could not be used. For these densely populated sites, estimation techniques using detailed 1980 U.S. Bureau of Census tract and block data were employed. The sectors formed

by the radii and divisions at 16 compass directions were drawn on census tract or census block maps. Population within each census tract or census block was apportioned to each sector on an area basis if the distribution of population appeared relatively uniform. If information gathered in the field or through aerial photographs showed the distribution of population within each census tract or census block to be non-uniform, the population was apportioned according to these observations.

TABLE 3. County Averages - Number of Persons Per Household

State	County	Average Persons/Household
Arizona	Apache	4.09
	Coconino	3.15
Colorado	Fremont	2.59
	Garfield	2.72
	Gunnison	2.47
	La Plata	2.70
	Montrose	2.84
	San Miguel	2.55
Idaho	Boise	2.71
New Mexico	McKinley	3.73
	San Juan	3.24
	Valencia	3.17
North Dakota	Billings	3.10
	Bowman	2.77
	Stark	2.91
Oregon	Lake	2.68
South Dakota	Fall River	2.53
Texas	Karnes	2.96
	Live Oak	2.88
	Wilson	3.06
Utah	Emery	3.48
	Garfield	3.00
	Grand	2.98
	San Juan	4.04
Washington	Lincoln	2.56
	Stevens	2.92
Wyoming	Carbon	2.85
	Converse	2.99
	Fremont	2.98
	Natrona	2.75
	Sweetwater	2.95

TABLE 4. City Averages - Number of Persons Per Household

		Average Persons/Household
Gunnison, Colorado		3.02(1)
Rifle, Colorado		2.70(2)
Houston, Pennsylvania		2.35(3)
Chartier Township North Strabane Township Cecil Township	Pennsylvania	2.92(3)

(1) 1981 city survey.
(2) 1983 city survey.
(3) 1980 U.S. Bureau of Census.

RESULTS

Estimated total population within a 5 kilometer radius of the centroid of the tailings area is shown for active mill sites in Table 5, and for inactive mill sites in Table 6. As evidenced by the tables, total population observed varied significantly, ranging from 7 sites having zero population to the Salt Lake City, Utah site having an estimated total population of 91,498 within the defined 5 kilometer radius.

The distribution of these total population numbers for each of the 52 sites can be found in the tables in Appendix A. Each table gives precise longitudinal and latitudinal coordinates of the centroid of the tailings area, as well as the number of people in each sector formed by transposing 16 compass point directions upon concentric rings of 1/2, 1, 2, 3, 4 and 5 kilometers around the tailing centroid. These tables appear in the order shown in Tables 5 and 6.

TABLE 5. Estimated Total Population Within 5 Kilometers of Active Uranium Mills

Operating Mills (16)	Total Population
Uravan, Colorado	349
Canon City, Colorado	5,933
Milan, New Mexico	396
Ambrosia Lake, New Mexico (Kerr-McGee Nuclear)	1
Panna Maria, Texas	453
Blanding, Utah	8
La Sal, Utah	343
Moab, Utah	2,361
Ford, Washington	411
Gas Hills, Wyoming (Pathfinder Mines)	0
Gas Hills, Wyoming (Union Carbide)	0
Powder River, Wyoming (Rocky Mountain Energy)	0
Powder River, Wyoming (Exxon Minerals)	6
Red Desert, Wyoming	0
Shirley Basin, Wyoming (Pathfinder Mines)	0
Shirley Basin, Wyoming (Petrotomics)	357

Shut-Down Mills (11)	Total Population
Bluewater, New Mexico	907
Seboyeta, New Mexico	166
Church Rock, New Mexico	312
Marquez, New Mexico	15
Edgemont, South Dakota	1,421
Falls City, Texas (Conoco-Pioneer Nuclear)	42
Ray Point, Texas	130
Hanksville, Utah	171
Wellpinit, Washington	49
Jeffrey City, Wyoming	906
Gas Hills, Wyoming (Federal-American Partners)	0

TABLE 6. Estimated Total Population Within 5 Kilometers of Inactive Uranium Mills

Inactive Mills (25)	Total Population
Monument Valley, Arizona	60
Tuba City, Arizona	64
Durango, Colorado	12,058
Grand Junction, Colorado	38,011
Gunnison, Colorado	7,315
Maybell, Colorado	0
Naturita, Colorado (General Electric)	896
Naturita, Colorado (Ranchers Exploration)	3
New Rifle, Colorado	723
Old Rifle, Colorado	5,659
Slick Rock, Colorado (North Continent)	10
Slick Rock, Colorado (Union Carbide)	39
Lowman, Idaho	218
Ambrosia Lake, New Mexico (Phillips Petroleum)	2
Shiprock, New Mexico	4,948
Belfield, North Dakota	1,584
Bowman, North Dakota	33
Lakeview, Oregon	4,184
Canonsburg, Pennsylvania	22,135
Falls City, Texas (Susquehanna Western)	45
Green River, Utah	1,498
Mexican Hat, Utah	303
Salt Lake City, Utah	91,498
Converse County, Wyoming	18
Riverton, Wyoming	11,738

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APPENDIX A
MILL SITE POPULATION TABLES

Site Uravan, Colorado

Latitude 38^{o} 22' 00" N Longitude 108^{o} 45' 00" W

Estimated Population - June 1983

	Radial Distance (km)					
Direction	0.0-0.5	0.5-1.0	1.0-2.0	2.0-3.0	3.0-4.0	4.0-5.0
N	0	45	108	0	0	0
NNE	0	77	9	0	0	0
NE	0	0	0	0	0	0
ENE	0	11	0	0	0	0
E	0	14	28	0	0	0
ESE	0	0	0	6	3	0
SE	0	0	0	0	0	0
SSE	0	0	0	0	0	0
S	0	0	0	0	0	0
SSW	0	0	0	0	0	0
SW	0	0	0	0	0	0
WSW	0	0	0	0	0	0
W	0	0	0	0	0	0
WNW	0	0	0	0	0	0
NW	0	0	0	0	0	0
NNW	0	0	48	0	0	0
Total	0	147	193	6	3	0

Total Population (0.0-5.0 km) 349

Site Canon City, Colorado

Latitude 38^{o} 23' 46" N Longitude 105^{o} 13' 45" W

Estimated Population - June 1983

	Radial Distance (km)					
Direction	0.0-0.5	0.5-1.0	1.0-2.0	2.0-3.0	3.0-4.0	4.0-5.0
N	0	0	0	5	935	1158
NNE	0	0	0	124	899	715
NE	0	0	0	39	715	303
ENE	0	0	0	0	88	52
E	0	0	0	0	0	0
ESE	0	0	0	0	0	0
SE	0	0	0	0	0	0
SSE	0	0	0	0	5	0
S	0	0	0	0	3	8
SSW	0	0	0	0	0	0
SW	0	0	0	0	0	0
WSW	0	0	0	16	0	0
W	0	0	0	0	0	0
WNW	0	0	0	0	0	0
NW	0	0	0	0	0	47
NNW	0	0	0	0	122	699
Total	0	0	0	184	2,767	2,982

Total Population (0.0-5.0 km) 5933

Site Milan, New Mexico

Latitude 35^{o} 14' 31" N Longitude 107^{o} 51' 46" W

Estimated Population - June 1983

	Radial Distance (km)					
Direction	0.0-0.5	0.5-1.0	1.0-2.0	2.0-3.0	3.0-4.0	4.0-5.0
N	0	0	0	0	0	0
NNE	0	0	0	0	0	0
NE	0	0	0	0	3	0
ENE	0	0	0	0	0	0
E	0	0	3	0	0	0
ESE	0	0	0	0	0	0
SE	0	0	0	0	0	0
SSE	0	0	3	0	0	0
S	0	0	51	22	0	0
SSW	0	0	67	16	29	41
SW	0	0	44	3	0	10
WSW	0	0	22	63	13	6
W	0	0	0	0	0	0
WNW	0	0	0	0	0	0
NW	0	0	0	0	0	0
NNW	0	0	0	0	0	0
Total	0	0	190	104	45	57

Total Population (0.0-5.0 km) 396

Site Ambrosia Lake, New Mexico (Kerr-McGee Nuclear)

Latitude 35° 23' 39" N Longitude 107° 49' 47" W

Estimated Population - June 1983

	Radial Distance (km)					
Direction	0.0-0.5	0.5-1.0	1.0-2.0	2.0-3.0	3.0-4.0	4.0-5.0
N	0	0	0	0	0	0
NNE	0	0	0	0	*	*
NE	0	0	0	*	*	*
ENE	0	0	0	*	*	*
E	0	0	0	0	*	*
ESE	0	0	0	0	0	*
SE	0	0	0	0	0	0
SSE	0	0	0	0	0	0
S	0	0	0	0	0	0
SSW	0	0	0	0	0	0
SW	0	0	0	0	0	0
WSW	0	0	0	0	0	0
W	0	0	0	0	0	0
WNW	0	0	0	0	0	0
NW	0	0	0	0	0	0
NNW	0	0	0	1	0	0
Total	0	0	0	1	0	0

Total Population (0.0-5.0 km) 1

* Sector lies within area apportioned to Ambrosia Lake, New Mexico (Phillips Petroleum) mill.

Site Panna Maria, Texas

Latitude 28^{o} 57' 33" N Longitude 97^{o} 56' 31" W

Estimated Population - June 1983

	Radial Distance (km)					
Direction	0.0-0.5	0.5-1.0	1.0-2.0	2.0-3.0	3.0-4.0	4.0-5.0
N	0	0	0	0	0	0
NNE	0	0	3	0	0	9
NE	0	0	3	0	6	3
ENE	0	0	0	6	0	18
E	0	0	9	12	21	68
ESE	0	0	9	3	9	0
SE	0	0	6	0	0	3
SSE	0	6	0	0	0	0
S	0	6	9	0	0	6
SSW	0	0	3	0	6	24
SW	0	0	0	0	3	6
WSW	0	0	0	6	12	9
W	0	0	0	3	15	136
WNW	0	0	0	0	6	0
NW	0	0	0	3	3	0
NNW	0	0	0	0	0	3
Total	0	12	42	33	81	285

Total Population (0.0-5.0 km) 453

Site Blanding, Utah

Latitude 37° 31' 37" N Longitude 109° 30' 33" W

Estimated Population - June 1983

	Radial Distance (km)					
Direction	0.0-0.5	0.5-1.0	1.0-2.0	2.0-3.0	3.0-4.0	4.0-5.0
N	0	0	0	0	0	0
NNE	0	0	0	0	0	4
NE	0	0	0	0	0	0
ENE	0	0	0	0	0	0
E	0	0	0	0	0	0
ESE	0	0	0	0	0	0
SE	0	0	0	0	0	0
SSE	0	0	0	0	0	4
S	0	0	0	0	0	0
SSW	0	0	0	0	0	0
SW	0	0	0	0	0	0
WSW	0	0	0	0	0	0
W	0	0	0	0	0	0
WNW	0	0	0	0	0	0
NW	0	0	0	0	0	0
NNW	0	0	0	0	0	0
Total	0	0	0	0	0	8

Total Population (0.0-5.0 km) 8

Site La Sal, Utah

Latitude 38^{o} 16' 00" Longitude 109^{o} 16' 30" W

Estimated Population - June 1983

	Radial Distance (km)					
Direction	0.0-0.5	0.5-1.0	1.0-2.0	2.0-3.0	3.0-4.0	4.0-5.0
N	0	0	53	85	12	0
NNE	0	8	28	57	0	40
NE	0	0	4	0	0	0
ENE	0	0	0	0	0	0
E	0	0	0	0	0	0
ESE	0	0	0	0	0	0
SE	0	0	0	0	0	0
SSE	0	0	0	0	0	0
S	0	0	0	0	0	0
SSW	0	0	0	0	0	0
SW	0	0	0	0	0	0
WSW	0	0	0	0	0	0
W	0	0	0	0	0	0
WNW	0	0	0	0	4	0
NW	0	0	0	0	0	4
NNW	0	0	20	12	16	0
Total	0	8	105	154	32	44

Total Population (0.0-5.0 km) 343

Site Moab, Utah

Latitude 38° 35' 59" N Longitude 109° 35' 44" W

Estimated Population - June 1983

	Radial Distance (km)					
Direction	0.0-0.5	0.5-1.0	1.0-2.0	2.0-3.0	3.0-4.0	4.0-5.0
N	0	0	0	0	0	0
NNE	0	0	0	0	0	0
NE	0	0	0	0	0	0
ENE	0	0	6	0	0	0
E	0	0	3	3	0	0
ESE	0	0	0	9	674	668
SE	0	0	0	0	420	557
SSE	0	0	0	0	0	0
S	0	0	0	0	0	0
SSW	0	0	0	0	0	0
SW	0	0	0	0	0	0
WSW	0	0	0	0	0	0
W	0	0	0	0	0	0
WNW	0	0	0	0	0	0
NW	0	0	0	21	0	0
NNW	0	0	0	0	0	0
Total	0	0	9	33	1094	1225

Total Population (0.0-5.0 km) 2361

Site Ford, Washington

Latitude 47° 54' 06" N Longitude 117° 49' 58" W

Estimated Population - June 1983

	Radial Distance (km)					
Direction	0.0-0.5	0.5-1.0	1.0-2.0	2.0-3.0	3.0-4.0	4.0-5.0
N	0	0	20	12	15	0
NNE	0	0	20	3	6	0
NE	0	0	15	12	20	12
ENE	0	0	29	29	6	0
E	0	3	0	0	0	0
ESE	0	0	0	0	0	3
SE	0	0	0	0	3	35
SSE	0	0	0	0	0	0
S	0	0	0	3	3	3
SSW	0	0	0	0	9	0
SW	0	0	0	0	3	3
WSW	0	0	0	3	15	0
W	0	0	0	58	6	3
WNW	0	0	0	23	0	0
NW	0	0	0	3	0	0
NNW	0	0	9	12	0	0
Total	0	3	93	157	96	62

Total Population (0.0-5.0 km) 411

Site Gas Hills, Wyoming (Pathfinder Mines)

Latitude 42° 49' 55" N Longitude 107° 29' 23" W

Estimated Population - June 1983

	Radial Distance (km)					
Direction	0.0-0.5	0.5-1.0	1.0-2.0	2.0-3.0	3.0-4.0	4.0-5.0
N	0	0	0	0	0	0
NNE	0	0	0	0	0	0
NE	0	0	0	0	0	0
ENE	0	0	0	0	0	0
E	0	0	0	0	0	0
ESE	0	0	0	0	0	0
SE	0	0	0	0	0	0
SSE	0	0	0	0	0	*
S	0	0	0	0	*	*
SSW	0	0	0	*	*	*
SW	0	0	0	0	*	*
WSW	0	0	0	0	0	*
W	0	0	0	0	0	0
WNW	0	0	0	0	0	0
NW	0	0	0	0	0	0
NNW	0	0	0	0	0	0
Total	0	0	0	0	0	0

Total Population (0.0-5.0 km) 0

* Sector lies within area apportioned to Gas Hills, Wyoming (Federal-American Partners) mill.

Site Gas Hills, Wyoming (Union Carbide)

Latitude 42° 49' 45" N Longitude 107° 29' 34" W

Estimated Population - June 1983

	Radial Distance (km)					
Direction	0.0-0.5	0.5-1.0	1.0-2.0	2.0-3.0	3.0-4.0	4.0-5.0
N	0	0	0	0	0	0
NNE	0	0	0	0	0	0
NE	0	0	0	0	0	0
ENE	0	0	0	0	0	0
E	0	0	0	0	0	0
ESE	0	0	0	0	0	0
SE	0	0	0	0	0	0
SSE	0	0	0	0	0	0
S	0	0	0	0	0	0
SSW	0	0	0	0	0	0
SW	0	0	0	0	0	0
WSW	0	0	0	0	0	0
W	0	0	0	0	0	0
WNW	0	0	0	0	0	0
NW	0	0	0	0	0	0
NNW	0	0	0	0	0	0
Total	0	0	0	0	0	0

Total Population (0.0-5.0 km) 0

Site Powder River, Wyoming (Rocky Mountain Energy)

Latitude 43^{o} 16' 11" N Longitude 105^{o} 37' 46" W

Estimated Population - June 1983

	Radial Distance (km)					
Direction	0.0-0.5	0.5-1.0	1.0-2.0	2.0-3.0	3.0-4.0	4.0-5.0
N	0	0	0	0	0	0
NNE	0	0	0	0	0	0
NE	0	0	0	0	0	0
ENE	0	0	0	0	0	0
E	0	0	0	0	0	0
ESE	0	0	0	0	0	0
SE	0	0	0	0	*	*
SSE	0	0	0	*	*	*
S	0	0	0	*	*	*
SSW	0	0	0	0	*	*
SW	0	0	0	0	0	0
WSW	0	0	0	0	0	0
W	0	0	0	0	0	0
WNW	0	0	0	0	0	0
NW	0	0	0	0	0	0
NNW	0	0	0	0	0	0
Total	0	0	0	0	0	0

Total Population (0.0-5.0 km) 0

* Sector lies within area apportioned to Converse County, Wyoming mill.

Site Powder River, Wyoming (Exxon Minerals)

Latitude 43^{o} 04' 07" N Longitude 105^{o} 29' 49" W

Estimated Population - June 1983

	Radial Distance (km)					
Direction	0.0-0.5	0.5-1.0	1.0-2.0	2.0-3.0	3.0-4.0	4.0-5.0
N	0	0	0	0	6	0
NNE	0	0	0	0	0	0
NE	0	0	0	0	0	0
ENE	0	0	0	0	0	0
E	0	0	0	0	0	0
ESE	0	0	0	0	0	0
SE	0	0	0	0	0	0
SSE	0	0	0	0	0	0
S	0	0	0	0	0	0
SSW	0	0	0	0	0	0
SW	0	0	0	0	0	0
WSW	0	0	0	0	0	0
W	0	0	0	0	0	0
WNW	0	0	0	0	0	0
NW	0	0	0	0	0	0
NNW	0	0	0	0	0	0
Total	0	0	0	0	6	0

Total Population (0.0-5.0 km) 6

Site Red Desert, Wyoming

Latitude 42^{o} 02' 56" N Longitude 107^{o} 53' 28" W

Estimated Population - June 1983

	Radial Distance (km)					
Direction	0.0-0.5	0.5-1.0	1.0-2.0	2.0-3.0	3.0-4.0	4.0-5.0
N	0	0	0	0	0	0
NNE	0	0	0	0	0	0
NE	0	0	0	0	0	0
ENE	0	0	0	0	0	0
E	0	0	0	0	0	0
ESE	0	0	0	0	0	0
SE	0	0	0	0	0	0
SSE	0	0	0	0	0	0
S	0	0	0	0	0	0
SSW	0	0	0	0	0	0
SW	0	0	0	0	0	0
WSW	0	0	0	0	0	0
W	0	0	0	0	0	0
WNW	0	0	0	0	0	0
NW	0	0	0	0	0	0
NNW	0	0	0	0	0	0
Total	0	0	0	0	0	0

Total Population (0.0-5.0 km) 0

Site Shirley Basin, Wyoming (Pathfinder Mines)

Latitude 42^{o} 22' 14" N Longitude 106^{o} 10' 37" W

Estimated Population - June 1983

	Radial Distance (km)					
Direction	0.0-0.5	0.5-1.0	1.0-2.0	2.0-3.0	3.0-4.0	4.0-5.0
N	0	0	0	0	0	0
NNE	0	0	0	0	0	0
NE	0	0	0	0	0	0
ENE	0	0	0	0	0	0
E	0	0	0	0	0	0
ESE	0	0	0	0	0	0
SE	0	0	0	0	0	0
SSE	0	0	0	0	0	*
S	0	0	0	0	*	*
SSW	0	0	0	0	*	*
SW	0	0	0	0	*	*
WSW	0	0	0	0	0	*
W	0	0	0	0	0	0
WNW	0	0	0	0	0	0
NW	0	0	0	0	0	0
NNW	0	0	0	0	0	0
Total	0	0	0	0	0	0

Total Population (0.0-5.0 km) 0

* Sector lies within area apportioned to Shirley Basin, Wyoming (Petrotomics) mill.

Site Shirley Basin, Wyoming (Petrotomics)

Latitude 42^{o} 20' 04" N Longitude 106^{o} 11' 49" W

Estimated Population - June 1983

	Radial Distance (km)					
Direction	0.0-0.5	0.5-1.0	1.0-2.0	2.0-3.0	3.0-4.0	4.0-5.0
N	0	0	0	0	*	*
NNE	0	0	0	0	*	*
NE	0	0	0	0	*	*
ENE	0	0	0	0	0	*
E	0	0	0	0	0	0
ESE	0	0	0	0	0	0
SE	0	0	0	0	0	0
SSE	0	0	0	0	0	0
S	0	0	0	0	178	0
SSW	0	0	0	0	179	0
SW	0	0	0	0	0	0
WSW	0	0	0	0	0	0
W	0	0	0	0	0	0
WNW	0	0	0	0	0	0
NW	0	0	0	0	0	0
NNW	0	0	0	0	0	*
Total	0	0	0	0	357	0

Total Population (0.0-5.0 km) 357

* Sector lies within area apportioned to Shirley Basin, Wyoming (Pathfinder Mines) mill.

Site Bluewater, New Mexico

Latitude 35^{o} 16' 12" N Longitude 107^{o} 56' 44" W

Estimated Population - June 1983

	Radial Distance (km)					
Direction	0.0-0.5	0.5-1.0	1.0-2.0	2.0-3.0	3.0-4.0	4.0-5.0
N	0	0	0	0	0	0
NNE	0	0	0	0	0	0
NE	0	0	0	0	0	0
ENE	0	0	0	0	0	0
E	0	0	0	0	0	0
ESE	0	0	0	0	0	0
SE	0	0	0	0	6	0
SSE	0	0	0	38	10	13
S	0	0	6	29	13	0
SSW	0	0	0	41	13	19
SW	0	0	0	6	171	0
WSW	0	0	0	16	418	0
W	0	0	0	3	16	0
WNW	0	0	0	3	19	54
NW	0	0	0	0	0	13
NNW	0	0	0	0	0	0
Total	0	0	6	136	666	99

Total Population (0.0-5.0 km) 907

Site Seboyeta, New Mexico

Latitude 35^{o} 11' 09" N Longitude 107^{o} 20' 09" W

Estimated Population - June 1983

	Radial Distance (km)					
Direction	0.0-0.5	0.5-1.0	1.0-2.0	2.0-3.0	3.0-4.0	4.0-5.0
N	0	0	0	0	0	0
NNE	0	0	0	0	0	0
NE	0	0	0	0	0	0
ENE	0	0	0	0	0	0
E	0	0	0	0	0	0
ESE	0	0	0	0	0	0
SE	0	0	0	0	0	0
SSE	0	0	0	0	0	0
S	0	0	0	0	0	0
SSW	0	0	0	0	0	0
SW	0	0	0	0	0	0
WSW	0	0	0	0	32	19
W	0	0	0	0	0	35
WNW	0	0	0	0	10	70
NW	0	0	0	0	0	0
NNW	0	0	0	0	0	0
Total	0	0	0	0	42	124

Total Population (0.0-5.0 km) 166

Site Church Rock, New Mexico

Latitude 35^{o} 38' 47" N Longitude 108^{o} 30' 08" W

Estimated Population - June 1983

	Radial Distance (km)					
Direction	0.0-0.5	0.5-1.0	1.0-2.0	2.0-3.0	3.0-4.0	4.0-5.0
N	0	0	7	0	0	0
NNE	0	0	0	0	15	0
NE	0	0	0	0	19	0
ENE	0	0	0	0	7	0
E	0	0	0	0	0	15
ESE	0	0	0	0	7	19
SE	0	0	0	4	11	19
SSE	0	0	7	4	4	22
S	0	0	0	0	0	41
SSW	0	0	0	15	22	19
SW	0	0	0	4	0	15
WSW	0	0	0	7	0	0
W	0	0	4	0	0	0
WNW	0	0	0	0	0	0
NW	0	0	0	11	0	0
NNW	0	0	7	7	0	0
Total	0	0	25	52	85	150

Total Population (0.0-5.0 km) 312

Site Marquez, New Mexico

Latitude 35^{o} 18' 59" N Longitude 107^{o} 16' 28" W

Estimated Population - June 1983

	Radial Distance (km)					
Direction	0.0-0.5	0.5-1.0	1.0-2.0	2.0-3.0	3.0-4.0	4.0-5.0
N	0	0	0	0	0	0
NNE	0	0	0	0	0	0
NE	0	0	0	0	0	0
ENE	0	0	0	0	0	0
E	0	0	0	0	0	0
ESE	0	0	0	0	0	0
SE	0	0	0	0	0	0
SSE	0	0	0	0	0	0
S	0	0	0	0	0	0
SSW	0	0	0	0	0	0
SW	0	0	0	0	0	0
WSW	0	0	0	0	0	0
W	0	0	0	15	0	0
WNW	0	0	0	0	0	0
NW	0	0	0	0	0	0
NNW	0	0	0	0	0	0
Total	0	0	0	15	0	0

Total Population (0.0-5.0 km) 15

Site Edgemont, South Dakota

Latitude 43^{o} 17' 43" N Longitude 103^{o} 48' 46" W

Estimated Population - June 1983

	Radial Distance (km)					
Direction	0.0-0.5	0.5-1.0	1.0-2.0	2.0-3.0	3.0-4.0	4.0-5.0
N	0	0	5	8	0	0
NNE	0	0	3	5	8	10
NE	0	0	0	3	0	0
ENE	0	0	0	0	0	0
E	0	0	0	0	0	0
ESE	0	0	0	3	3	0
SE	0	0	0	0	3	0
SSE	0	0	0	0	3	0
S	0	0	0	0	0	3
SSW	0	0	0	0	0	0
SW	0	0	20	0	3	5
WSW	3	0	63	0	0	0
W	18	20	306	58	0	0
WNW	10	18	612	94	8	0
NW	0	0	83	0	0	10
NNW	0	0	33	0	0	0
Total	31	38	1,125	171	28	28

Total Population (0.0-5.0 km) 1,421

Site Falls City, Texas (Conoco - Pioneer Nuclear)

Latitude 28° 54' 03" N Longitude 98° 05' 40" W

Estimated Population - June 1983

	Radial Distance (km)					
Direction	0.0-0.5	0.5-1.0	1.0-2.0	2.0-3.0	3.0-4.0	4.0-5.0
N	0	0	0	0	0	0
NNE	0	0	0	3	0	3
NE	0	0	0	3	6	0
ENE	0	0	0	0	0	0
E	0	0	0	0	0	0
ESE	0	0	0	0	0	0
SE	0	0	0	0	3	3
SSE	0	0	0	0	0	6
S	0	0	0	0	0	6
SSW	0	0	0	0	0	0
SW	0	0	0	6	0	*
WSW	0	0	0	0	*	*
W	0	0	3	*	*	*
WNW	0	0	0	*	*	*
NW	0	0	0	0	*	*
NNW	0	0	0	0	0	0
Total	0	0	3	12	9	18

Total Population (0.0-5.0 km) 42

* Sector lies within area apportioned to Falls City, Texas (Susquehanna Western) mill.

Site Ray Point, Texas

Latitude 28^{o} 31' 11" N Longitude 98^{o} 06' 05" W

Estimated Population - June 1983

	Radial Distance (km)					
Direction	0.0-0.5	0.5-1.0	1.0-2.0	2.0-3.0	3.0-4.0	4.0-5.0
N	0	0	0	0	0	0
NNE	0	0	3	9	6	14
NE	0	0	3	3	0	0
ENE	0	0	0	3	3	3
E	0	0	6	3	9	6
ESE	0	0	9	0	6	0
SE	0	0	0	0	3	0
SSE	0	0	0	3	0	0
S	0	0	0	0	0	0
SSW	0	0	0	0	0	0
SW	0	0	0	0	3	35
WSW	0	0	0	0	0	0
W	0	0	0	0	0	0
WNW	0	0	0	0	0	0
NW	0	0	0	0	0	0
NNW	0	0	0	0	0	0
Total	0	0	21	21	30	58

Total Population (0.0-5.0 km) 130

Site Hanksville, Utah

Latitude 37^{o} 43' 06" N Longitude 110^{o} 40' 51" W

Estimated Population - June 1983

	Radial Distance (km)					
Direction	0.0-0.5	0.5-1.0	1.0-2.0	2.0-3.0	3.0-4.0	4.0-5.0
N	0	0	0	0	0	0
NNE	0	0	0	0	0	0
NE	0	0	0	0	0	0
ENE	0	0	0	0	0	0
E	0	0	0	0	0	0
ESE	0	0	0	0	0	0
SE	0	0	0	0	0	0
SSE	0	0	0	0	0	0
S	0	0	0	0	0	0
SSW	0	0	0	0	0	171
SW	0	0	0	0	0	0
WSW	0	0	0	0	0	0
W	0	0	0	0	0	0
WNW	0	0	0	0	0	0
NW	0	0	0	0	0	0
NNW	0	0	0	0	0	0
Total	0	0	0	0	0	171

Total Population (0.0-5.0 km) 171

Site Wellpinit, Washington

Latitude 47° 52' 27" N Longitude 118° 07' 00" W

Estimated Population - June 1983

	Radial Distance (km)					
Direction	0.0-0.5	0.5-1.0	1.0-2.0	2.0-3.0	3.0-4.0	4.0-5.0
N	0	0	0	0	0	0
NNE	0	0	0	0	0	0
NE	0	0	0	0	0	0
ENE	0	0	0	0	0	0
E	0	0	0	0	0	0
ESE	0	0	0	0	3	6
SE	0	0	0	0	3	0
SSE	0	0	0	0	0	0
S	0	0	0	0	0	0
SSW	0	0	0	0	0	3
SW	0	0	0	0	0	0
WSW	0	0	0	0	0	3
W	0	0	0	0	26	0
WNW	0	0	0	0	0	5
NW	0	0	0	0	0	0
NNW	0	0	0	0	0	0
Total	0	0	0	0	32	17

Total Population (0.0-5.0 km) 49

Site Jeffrey City, Wyoming

Latitude 42° 30' 32" N Longitude 107° 47' 14" W

Estimated Population - June 1983

	Radial Distance (km)					
Direction	0.0-0.5	0.5-1.0	1.0-2.0	2.0-3.0	3.0-4.0	4.0-5.0
N	0	0	0	0	0	0
NNE	0	0	0	0	0	0
NE	0	0	0	0	0	0
ENE	0	0	0	0	0	0
E	0	0	0	0	0	0
ESE	0	3	0	0	0	0
SE	0	0	0	21	6	0
SSE	0	0	0	3	0	9
S	0	0	0	0	0	0
SSW	0	0	0	0	0	0
SW	0	0	0	0	140	0
WSW	0	0	0	0	551	167
W	0	0	0	0	0	0
WNW	0	0	0	0	0	0
NW	0	0	0	3	0	0
NNW	0	0	0	3	0	0
Total	0	3	0	30	697	176

Total Population (0.0-5.0 km) 906

Site Gas Hills, Wyoming (Federal-American Partners)

Latitude 42° 47' 59" N Longitude 107° 30' 08" W

Estimated Population - June 1983

	Radial Distance (km)					
Direction	0.0-0.5	0.5-1.0	1.0-2.0	2.0-3.0	3.0-4.0	4.0-5.0
N	0	0	0	0	*	*
NNE	0	0	0	*	*	*
NE	0	0	0	0	*	*
ENE	0	0	0	0	0	*
E	0	0	0	0	0	0
ESE	0	0	0	0	0	0
SE	0	0	0	0	0	0
SSE	0	0	0	0	0	0
S	0	0	0	0	0	0
SSW	0	0	0	0	0	0
SW	0	0	0	0	0	0
WSW	0	0	0	0	0	0
W	0	0	0	0	0	0
WNW	0	0	0	0	0	0
NW	0	0	0	0	0	0
NNW	0	0	0	0	0	*
Total	0	0	0	0	0	0

Total Population (0.0-5.0 km) 0

* Sector lies within area apportioned to Gas Hills, Wyoming (Pathfinder Mines) mill.

Site Monument Valley, Arizona

Latitude 36° 55' 57" N Longitude 109° 51' 57" W

Estimated Population - June 1983

	Radial Distance (km)					
Direction	0.0-0.5	0.5-1.0	1.0-2.0	2.0-3.0	3.0-4.0	4.0-5.0
N	0	0	0	0	4	8
NNE	0	0	0	0	4	0
NE	0	0	0	0	0	0
ENE	0	0	0	0	0	0
E	0	4	4	0	0	0
ESE	0	0	0	0	0	0
SE	0	4	0	0	0	0
SSE	0	8	8	0	0	0
S	0	4	8	4	0	0
SSW	0	0	0	0	0	0
SW	0	0	0	0	0	0
WSW	0	0	0	0	0	0
W	0	0	0	0	0	0
WNW	0	0	0	0	0	0
NW	0	0	0	0	0	0
NNW	0	0	0	0	0	0
Total	0	20	20	4	8	8

Total Population (0.0-5.0 km) 60

Site Tuba City, Arizona

Latitude 36° 08' 41" N Longitude 111° 08' 08" W

Estimated Population - June 1983

	Radial Distance (km)					
Direction	0.0-0.5	0.5-1.0	1.0-2.0	2.0-3.0	3.0-4.0	4.0-5.0
N	0	9	0	0	0	0
NNE	0	0	3	0	0	0
NE	0	0	3	0	0	0
ENE	0	0	0	6	0	6
E	0	0	0	0	0	0
ESE	0	0	0	3	0	0
SE	0	0	0	0	0	0
SSE	0	0	0	0	0	0
S	0	0	0	0	0	0
SSW	0	0	0	0	0	0
SW	0	0	0	0	0	0
WSW	0	0	3	3	0	13
W	0	0	0	0	0	0
WNW	0	0	3	0	0	0
NW	0	0	0	3	0	0
NNW	0	9	0	0	0	0
Total	0	18	12	15	0	19

Total Population (0.0-5.0 km) 64

Site Durango, Colorado

Latitude 37^{o} 15' 55" N Longitude 107^{o} 53' 08" W

Estimated Population - June 1983

	Radial Distance (km)					
Direction	0.0-0.5	0.5-1.0	1.0-2.0	2.0-3.0	3.0-4.0	4.0-5.0
N	0	0	232	928	906	161
NNE	0	4	418	1113	1278	963
NE	0	217	954	642	570	726
ENE	0	382	920	347	0	0
E	0	409	288	0	0	0
ESE	0	149	59	0	0	0
SE	0	0	0	0	0	0
SSE	0	0	3	3	0	92
S	0	0	0	0	0	0
SSW	0	0	0	0	0	0
SW	0	0	0	0	3	0
WSW	0	0	0	0	3	8
W	0	0	5	16	8	0
WNW	0	0	105	0	0	76
NW	0	54	3	3	0	0
NNW	3	3	0	0	0	0
Total	3	1,218	2,987	3,052	2,768	2,026

Total Population (0.0-5.0 km) 12,058

Site Grand Junction, Colorado

Latitude 39^{o} 02' 45" N Longitude 108^{o} 03' 04" W

Estimated Population - June 1983

	Radial Distance (km)					
Direction	0.0-0.5	0.5-1.0	1.0-2.0	2.0-3.0	3.0-4.0	4.0-5.0
N	0	0	2364	1508	2392	2279
NNE	0	3	979	842	3422	1024
NE	0	24	106	504	1631	1599
ENE	0	9	67	524	216	471
E	0	8	62	81	48	118
ESE	0	109	575	922	789	320
SE	9	92	590	334	542	435
SSE	3	154	687	191	0	0
S	6	102	820	125	0	0
SSW	0	113	424	0	0	0
SW	0	90	463	0	0	0
WSW	0	26	156	40	29	15
W	0	28	13	246	290	399
WNW	11	39	15	342	244	481
NW	0	14	150	465	331	523
NNW	0	3	550	1646	2155	1624
Total	29	814	8,021	7,770	12,089	9,288

Total Population (0.0-5.0 km) 38,011

Site Gunnison, Colorado

Latitude 38^{o} 31' 56" N Longitude 106^{o} 56' 30" W

Estimated Population - June 1983

	Radial Distance (km)					
Direction	0.0-0.5	0.5-1.0	1.0-2.0	2.0-3.0	3.0-4.0	4.0-5.0
N	0	60	242	80	10	17
NNE	0	121	1090	1700	481	91
NE	0	60	607	1516	62	0
ENE	0	0	0	0	0	77
E	0	2	0	0	0	0
ESE	0	0	0	0	0	0
SE	0	0	0	0	0	0
SSE	0	0	0	2	2	5
S	0	0	0	59	7	0
SSW	0	0	0	2	0	0
SW	2	2	37	10	0	0
WSW	0	27	99	99	15	20
W	5	17	284	40	0	0
WNW	0	17	27	12	0	0
NW	0	20	57	2	0	0
NNW	0	63	72	90	0	5
Total	7	389	2,515	3,612	577	215

Total Population (0.0-5.0 km) 7315

Site Maybell, Colorado

Latitude 40° 32' 36" N Longitude 107° 59' 36" W

Estimated Population - June 1983

	Radial Distance (km)					
Direction	0.0-0.5	0.5-1.0	1.0-2.0	2.0-3.0	3.0-4.0	4.0-5.0
N	0	0	0	0	0	0
NNE	0	0	0	0	0	0
NE	0	0	0	0	0	0
ENE	0	0	0	0	0	0
E	0	0	0	0	0	0
ESE	0	0	0	0	0	0
SE	0	0	0	0	0	0
SSE	0	0	0	0	0	0
S	0	0	0	0	0	0
SSW	0	0	0	0	0	0
SW	0	0	0	0	0	0
WSW	0	0	0	0	0	0
W	0	0	0	0	0	0
WNW	0	0	0	0	0	0
NW	0	0	0	0	0	0
NNW	0	0	0	0	0	0
Total	0	0	0	0	0	0

Total Population (0.0-5.0 km) 0

Site Naturita, Colorado (General Electric)

Latitude 38^{o} 14' 30" N Longitude 108^{o} 36' 00" W

Estimated Population - June 1983

	Radial Distance (km)					
Direction	0.0-0.5	0.5-1.0	1.0-2.0	2.0-3.0	3.0-4.0	4.0-5.0
N	3	0	0	0	0	0
NNE	0	0	0	0	0	9
NE	0	0	6	3	9	60
ENE	0	0	0	3	3	37
E	0	0	0	0	0	0
ESE	0	0	0	0	57	352
SE	0	0	48	14	34	244
SSE	0	3	11	0	*	*
S	0	0	0	*	*	*
SSW	0	0	0	*	*	*
SW	0	0	0	0	*	*
WSW	0	0	0	0	0	*
W	0	0	0	0	0	0
WNW	0	0	0	0	0	0
NW	0	0	0	0	0	0
NNW	0	0	0	0	0	0
Total	3	3	65	20	103	702

Total Population (0.0-5.0 km) 896

* Sector lies within area apportioned to Naturita, Colorado (Ranchers Exploration) mill.

Site Naturita, Colorado (Ranchers Exploration)

Latitude 38^{o} 12' 00" N Longitude 108^{o} 37' 00" W

Estimated Population - June 1983

	Radial Distance (km)					
Direction	0.0-0.5	0.5-1.0	1.0-2.0	2.0-3.0	3.0-4.0	4.0-5.0
N	0	3	0	*	*	*
NNE	0	0	0	*	*	*
NE	0	0	0	*	*	*
ENE	0	0	0	0	*	*
E	0	0	0	0	0	0
ESE	0	0	0	0	0	0
SE	0	0	0	0	0	0
SSE	0	0	0	0	0	0
S	0	0	0	0	0	0
SSW	0	0	0	0	0	0
SW	0	0	0	0	0	0
WSW	0	0	0	0	0	0
W	0	0	0	0	0	0
WNW	0	0	0	0	0	0
NW	0	0	0	0	0	*
NNW	0	0	0	0	*	*
Total	0	3	0	0	0	0

Total Population (0.0-5.0 km) 3

* Sector lies within area apportioned to Naturita, Colorado (General Electric) mill.

Site New Rifle, Colorado

Latitude 39° 31' 28" N Longitude 107° 48' 49" W

Estimated Population - June 1983

	Radial Distance (km)					
Direction	0.0-0.5	0.5-1.0	1.0-2.0	2.0-3.0	3.0-4.0	4.0-5.0
N	0	3	0	0	0	0
NNE	19	22	3	0	0	0
NE	0	52	3	3	*	*
ENE	0	0	400	0	*	*
E	0	0	0	*	*	*
ESE	0	0	0	3	*	*
SE	0	0	141	0	0	0
SSE	0	0	3	8	0	0
S	0	0	0	8	0	0
SSW	0	0	11	11	3	3
SW	0	0	0	3	11	8
WSW	0	0	0	0	5	0
W	0	0	0	0	0	0
WNW	0	0	0	0	0	0
NW	0	0	0	0	0	0
NNW	0	0	0	0	0	0
Total	19	77	561	36	19	11

Total Population (0.0-5.0 km) 723

* Sector lies within area apportioned to Old Rifle, Colorado mill.

Site Old Rifle, Colorado

Latitude 39° 31' 45" N Longitude 107° 46' 19" W

Estimated Population - June 1983

	Radial Distance (km)					
Direction	0.0-0.5	0.5-1.0	1.0-2.0	2.0-3.0	3.0-4.0	4.0-5.0
N	0	143	251	127	184	22
NNE	0	78	189	11	8	3
NE	0	5	19	16	5	8
ENE	0	0	11	604	24	19
E	0	0	0	3	0	8
ESE	0	0	0	0	0	0
SE	0	0	0	0	0	0
SSE	0	11	0	0	0	5
S	0	8	5	0	0	3
SSW	0	0	138	0	0	0
SW	0	22	38	0	*	*
WSW	0	5	3	0	*	*
W	3	119	197	*	*	*
WNW	116	302	772	19	*	*
NW	146	375	680	38	0	0
NNW	0	138	230	429	119	0
Total	265	1206	2533	1247	340	68

Total Population (0.0-5.0 km) 5659

* Sector lies within area apportioned to New Rifle, Colorado mill.

Site Slick Rock, Colorado (North Continent)

Latitude 38° 02' 30" N Longitude 108° 53' 30" W

Estimated Population - June 1983

	Radial Distance (km)					
Direction	0.0-0.5	0.5-1.0	1.0-2.0	2.0-3.0	3.0-4.0	4.0-5.0
N	0	0	0	*	*	*
NNE	0	0	0	0	0	0
NE	0	0	0	0	0	0
ENE	0	0	0	0	0	0
E	0	0	0	0	0	0
ESE	0	0	0	0	0	0
SE	0	0	0	0	0	0
SSE	0	0	5	0	0	0
S	0	0	0	0	0	0
SSW	0	0	0	*	*	*
SW	0	0	*	*	*	*
WSW	0	*	*	*	*	*
W	0	*	*	*	*	*
WNW	5	*	*	*	*	*
NW	0	*	*	*	*	*
NNW	0	0	*	*	*	*
Total	5	0	5	0	0	0

Total Population (0.0-5.0 km) 10

* Sector lies within area apportioned to Slick Rock, Colorado (Union Carbide) mill.

Site Slick Rock, Colorado (Union Carbide)

Latitude 38^{o} 02' 43" N Longitude 108^{o} 54' 30" W

Estimated Population - June 1983

	Radial Distance (km)					
Direction	0.0-0.5	0.5-1.0	1.0-2.0	2.0-3.0	3.0-4.0	4.0-5.0
N	0	0	0	0	0	0
NNE	0	0	0	*	*	*
NE	0	0	*	*	*	*
ENE	0	0	*	*	*	*
E	0	*	*	*	*	*
ESE	0	*	*	*	*	*
SE	0	0	*	*	*	*
SSE	0	3	*	*	*	*
S	0	0	0	0	*	*
SSW	0	0	0	0	0	0
SW	0	28	0	0	0	0
WSW	0	8	0	0	0	0
W	0	0	0	0	0	0
WNW	0	0	0	0	0	0
NW	0	0	0	0	0	0
NNW	0	0	0	0	0	0
Total	0	39	0	0	0	0

Total Population (0.0-5.0 km) 39

* Sector lies within area apportioned to Slick Rock, Colorado (North Continent) mill.

Site Lowman, Idaho

Latitude 44° 05' 06" N Longitude 115° 36' 27" W

Estimated Population - June 1983

	Radial Distance (km)					
Direction	0.0-0.5	0.5-1.0	1.0-2.0	2.0-3.0	3.0-4.0	4.0-5.0
N	0	0	0	0	0	0
NNE	0	0	0	0	0	0
NE	0	0	0	0	0	0
ENE	0	0	0	0	0	0
E	0	0	0	0	8	0
ESE	0	0	0	0	8	30
SE	0	0	14	0	0	0
SSE	0	0	0	0	0	0
S	0	0	0	0	0	0
SSW	0	0	0	0	0	0
SW	3	49	14	0	0	0
WSW	0	19	24	0	0	0
W	3	8	35	0	0	0
WNW	3	0	0	0	0	0
NW	0	0	0	0	0	0
NNW	0	0	0	0	0	0
Total	9	76	87	0	16	30

Total Population (0.0-5.0 km) 218

Site Ambrosia Lake, New Mexico (Phillips Petroleum)

Latitude 35^{o} 24' 34" N Longitude 107^{o} 47' 57" W

Estimated Population - June 1983

	Radial Distance (km)					
Direction	0.0-0.5	0.5-1.0	1.0-2.0	2.0-3.0	3.0-4.0	4.0-5.0
N	0	0	0	0	0	0
NNE	0	0	0	0	0	0
NE	0	0	0	0	0	0
ENE	0	0	0	0	0	0
E	0	0	0	0	0	0
ESE	0	0	0	0	0	0
SE	0	0	0	0	0	0
SSE	0	0	0	0	0	0
S	0	0	0	0	0	0
SSW	0	0	0	0	*	*
SW	0	0	0	*	*	*
WSW	0	0	0	*	*	*
W	0	0	0	0	*	*
WNW	0	0	0	2	0	*
NW	0	0	0	0	0	0
NNW	0	0	0	0	0	0
Total	0	0	0	2	0	0

Total Population (0.0-5.0 km) 2

* Sector lies within area apportioned to Ambrosia Lake, New Mexico (Kerr-McGee Nuclear) mill.

Site Shiprock, New Mexico

Latitude 36^{o} 46' 11" N Longitude 108^{o} 41' 06" W

Estimated Population - June 1983

	Radial Distance (km)					
Direction	0.0-0.5	0.5-1.0	1.0-2.0	2.0-3.0	3.0-4.0	4.0-5.0
N	0	0	246	117	505	369
NNE	0	10	143	152	0	6
NE	0	0	87	463	78	0
ENE	0	6	78	84	246	75
E	0	0	10	0	0	0
ESE	0	0	0	0	0	0
SE	0	0	0	0	0	0
SSE	0	0	0	0	0	0
S	0	0	6	0	0	0
SSW	0	10	3	3	3	0
SW	0	110	295	62	0	0
WSW	0	0	207	49	3	0
W	0	0	382	45	16	0
WNW	0	3	162	26	36	0
NW	0	0	275	10	58	165
NNW	0	16	10	23	71	224
Total	0	155	1,904	1,034	1,016	839

Total Population (0.0-5.0 km) 4948

Site Belfield, North Dakota

Latitude 46^{o} 52' 50" N Longitude 103^{o} 10' 57" W

Estimated Population - June 1983

	Radial Distance (km)					
Direction	0.0-0.5	0.5-1.0	1.0-2.0	2.0-3.0	3.0-4.0	4.0-5.0
N	0	0	0	0	0	3
NNE	0	0	0	0	0	0
NE	0	0	0	0	6	0
ENE	0	0	0	6	0	3
E	0	0	3	9	3	15
ESE	0	0	3	9	0	0
SE	0	0	0	0	3	3
SSE	0	0	0	0	3	0
S	0	0	0	0	0	0
SSW	0	3	0	0	3	6
SW	0	0	0	0	0	6
WSW	0	0	0	3	0	0
W	0	3	210	0	0	37
WNW	0	0	573	55	0	53
NW	0	12	387	87	6	6
NNW	0	47	15	3	0	0
Total	0	65	1,191	172	24	132

Total Population (0.0-5.0 km) 1584

Site Bowman, North Dakota

Latitude 46° 13' 01" N Longitude 103° 32' 58" W

Estimated Population - June 1983

	Radial Distance (km)					
Direction	0.0-0.5	0.5-1.0	1.0-2.0	2.0-3.0	3.0-4.0	4.0-5.0
N	0	0	0	0	3	0
NNE	0	0	0	0	0	0
NE	0	0	0	0	0	0
ENE	0	0	0	0	0	0
E	0	3	0	0	0	0
ESE	0	0	0	3	0	0
SE	0	0	0	0	0	0
SSE	0	0	0	0	0	3
S	0	0	0	0	0	0
SSW	0	0	3	0	0	0
SW	0	0	0	0	0	3
WSW	0	0	0	0	0	0
W	0	0	0	0	0	0
WNW	0	0	0	0	3	6
NW	0	0	0	0	0	0
NNW	0	0	6	0	0	0
Total	0	3	9	3	6	12

Total Population (0.0-5.0 km) 33

Site Lakeview, Oregon

Latitude 42^{o} 12' 34" N Longitude 120^{o} 22' 01" W

Estimated Population - June 1983

	Radial Distance (km)					
Direction	0.0-0.5	0.5-1.0	1.0-2.0	2.0-3.0	3.0-4.0	4.0-5.0
N	0	0	21	19	54	0
NNE	0	8	83	0	0	0
NE	0	0	3	0	0	0
ENE	0	0	3	0	0	0
E	0	0	13	0	0	0
ESE	0	0	5	0	0	0
SE	0	0	158	925	257	0
SSE	0	0	174	699	1118	386
S	0	0	64	51	0	0
SSW	0	0	3	0	11	8
SW	0	0	0	5	3	5
WSW	0	0	0	0	11	43
W	0	0	0	0	0	11
WNW	0	0	3	0	0	8
NW	0	0	0	0	0	0
NNW	0	0	13	5	3	0
Total	0	16	543	1704	1457	464

Total Population (0.0-5.0 km) 4184

Site Canonsburg, Pennsylvania

Latitude 40° 15' 22" N Longitude 80° 12' 00" W

Estimated Population - June 1983

	Radial Distance (km)					
Direction	0.0-0.5	0.5-1.0	1.0-2.0	2.0-3.0	3.0-4.0	4.0-5.0
N	87	288	244	129	140	546
NNE	88	346	195	236	38	21
NE	90	346	1634	2056	82	38
ENE	57	262	1855	1382	263	143
E	67	139	496	222	719	400
ESE	47	264	859	184	76	94
SE	89	0	336	120	70	50
SSE	152	108	117	35	65	85
S	111	167	12	71	9	30
SSW	120	249	38	79	546	525
SW	29	120	870	360	561	18
WSW	0	415	624	15	15	73
W	0	113	413	63	105	102
WNW	5	35	149	91	15	30
NW	5	61	0	62	18	56
NNW	3	47	146	21	108	70
Total	950	2,960	7,988	5,126	2,830	2,281

Total Population (0.0-5.0 km) 22,135

Site Falls City, Texas (Susquehanna Western)

Latitude 28° 54' 16" N Longitude 98° 07' 40" W

Estimated Population - June 1983

	Radial Distance (km)					
Direction	0.0-0.5	0.5-1.0	1.0-2.0	2.0-3.0	3.0-4.0	4.0-5.0
N	0	0	0	0	0	6
NNE	0	0	0	0	0	0
NE	0	0	0	0	0	*
ENE	0	0	0	0	*	*
E	3	0	0	*	*	*
ESE	0	0	0	*	*	*
SE	0	0	0	0	*	*
SSE	0	0	0	0	0	0
S	0	0	6	0	0	0
SSW	0	0	0	0	0	0
SW	0	0	0	0	0	0
WSW	0	0	0	0	0	0
W	0	0	0	0	0	0
WNW	0	0	0	0	0	0
NW	0	0	6	0	12	3
NNW	0	0	6	0	3	0
Total	3	0	18	0	15	9

Total Population (0.0-5.0 km) 45

* Sector lies within area apportioned to Falls City, Texas (Conoco - Pioneer Nuclear) mill.

Site Green River, Utah

Latitude 38^{o} 58' 51" N Longitude 110^{o} 08' 42" W

Estimated Population - June 1983

	Radial Distance (km)					
Direction	0.0-0.5	0.5-1.0	1.0-2.0	2.0-3.0	3.0-4.0	4.0-5.0
N	0	0	17	17	17	3
NNE	0	0	7	4	0	0
NE	0	0	0	0	0	0
ENE	0	0	0	0	0	0
E	0	0	0	0	0	0
ESE	0	0	0	0	0	0
SE	0	0	0	0	0	0
SSE	0	0	0	0	0	0
S	0	0	0	0	0	0
SSW	0	0	0	0	0	0
SW	0	0	3	0	0	0
WSW	0	0	0	0	0	0
W	0	3	10	0	0	0
WNW	0	4	136	233	7	0
NW	0	7	63	459	136	0
NNW	0	0	21	97	237	17
Total	0	14	257	810	397	20

Total Population (0.0-5.0 km) 1498

Site Mexican Hat, Utah

Latitude 37° 08' 06" N Longitude 109° 52' 38" W

Estimated Population - June 1983

	Radial Distance (km)					
Direction	0.0-0.5	0.5-1.0	1.0-2.0	2.0-3.0	3.0-4.0	4.0-5.0
N	0	0	0	0	0	0
NNE	0	0	0	24	0	0
NE	0	0	0	77	0	0
ENE	0	0	0	0	0	0
E	0	0	0	0	0	0
ESE	0	0	0	0	0	0
SE	0	0	0	0	0	0
SSE	0	0	0	0	0	0
S	0	0	0	0	0	0
SSW	0	0	0	0	0	0
SW	0	0	267	0	0	0
WSW	0	0	0	0	0	0
W	0	0	4	0	0	0
WNW	0	4	8	0	0	0
NW	0	0	0	0	0	0
NNW	0	0	0	0	0	0
Total	0	4	279	101	0	0

Total Population (0.0-5.0 km) 384

Site Salt Lake City, Utah

Latitude 40^{o} 42' 08" N Longitude 111^{o} 54' 45" W

Estimated Population - June 1983

	Radial Distance (km)					
Direction	0.0-0.5	0.5-1.0	1.0-2.0	2.0-3.0	3.0-4.0	4.0-5.0
N	0	0	0	63	439	1600
NNE	0	0	0	20	1116	2407
NE	0	0	12	671	3702	5910
ENE	0	0	197	2790	3061	2893
E	0	0	551	3035	2759	3381
ESE	0	0	251	2050	3108	3713
SE	0	14	177	533	2410	3214
SSE	5	14	296	75	479	1118
S	5	45	65	70	2871	1984
SSW	0	30	25	228	3636	1800
SW	0	50	599	1275	1475	2440
WSW	0	10	350	625	1172	4739
W	0	30	114	1427	2189	4301
WNW	0	0	170	1027	461	371
NW	0	0	115	1371	111	0
NNW	0	0	0	83	1078	3092
Total	10	193	2,922	15,343	30,067	42,963

Total Population (0.0-5.0 km) 91,498

Site Converse County, Wyoming

Latitude 43^{o} 14' 12" N Longitude 105^{o} 37' 13" W

Estimated Population - June 1983

	Radial Distance (km)					
Direction	0.0-0.5	0.5-1.0	1.0-2.0	2.0-3.0	3.0-4.0	4.0-5.0
N	0	0	0	*	*	*
NNE	0	0	0	0	*	*
NE	0	0	0	0	0	0
ENE	0	0	0	0	0	0
E	0	0	0	0	0	0
ESE	0	0	0	0	0	0
SE	0	0	0	0	0	0
SSE	0	0	0	0	0	0
S	0	0	0	0	0	9
SSW	0	0	0	0	0	0
SW	0	0	0	9	0	0
WSW	0	0	0	0	0	0
W	0	0	0	0	0	0
WNW	0	0	0	0	0	0
NW	0	0	0	0	*	*
NNW	0	0	0	*	*	*
Total	0	0	0	9	0	9

Total Population (0.0-5.0 km) 18

* Sector lies within area apportioned to Powder River, Wyoming (Rocky Mountain Energy) mill.

Site Riverton, Wyoming

Latitude 42^{o} 59' 45" N Longitude 108^{o} 24' 29" W

Estimated Population - June 1983

	Radial Distance (km)					
Direction	0.0-0.5	0.5-1.0	1.0-2.0	2.0-3.0	3.0-4.0	4.0-5.0
N	0	0	0	331	1234	241
NNE	0	6	3	268	1749	4050
NE	0	12	12	3	712	1639
ENE	0	0	18	48	21	0
E	0	9	24	18	12	0
ESE	0	6	0	3	9	0
SE	0	0	0	0	0	0
SSE	0	0	0	0	30	0
S	0	0	0	0	0	0
SSW	12	0	15	3	0	6
SW	3	0	24	122	30	6
WSW	0	0	27	18	48	113
W	0	3	33	0	6	12
WNW	0	6	21	0	0	0
NW	0	6	15	0	18	298
NNW	0	0	0	0	331	104
Total	15	48	192	814	4200	6469

Total Population (0.0-5.0 km) 11,738